

# LAOGANG, CHINE: RECOVERING ENERGY FROM LANDFILL FACILITIES

## LANDFILL, A SOURCE OF RENEWABLE ENERGY

*The project is a landfill gas recovery and utilization in Laogang (East China Sea coast in Shanghai, in the district of Pudong), on an existing landfill site. The main objective was to collect and utilize gas (mainly methane) to generate electricity by installing LFG collection and pre-treatment system, electricity generation system and LFG flaring system on site.*

*To date it is the largest facility of its kind in operation in Asia.*

### INNOVATIONS

- ▶ The Laogang landfill facility began operating in 1989. But before 2008, no gas extraction and utilization systems existed to increase energy efficiency and little effort was made to capture the methane generated from the landfill.
- ▶ In 2008, the creation of the Shanghai Laogang Landfill Gas-to-Energy joint venture made it possible to guide this activity towards energy efficiency.
- ▶ The site commenced generating power in isolated mode for site use in July 2008. By 2012, the project has transitioned from a single safety MSW disposal base to a resources recovery and recycling solid waste base. The site has been connected to the electrical power grid, making Laogang a major MSW disposal base in Shanghai.

### KEY DATA

- 11 generators for an installed capacity of 15 MW
- Production potential of 120,000 MWh per year (102,000 MWh produced in 2014),
- Direct emissions reduction of 520,000 metric tons of CO<sub>2</sub> equivalent per year.

### STAKEHOLDERS

- ▶ The project to recover biogas from the Laogang landfill facility was set up in 2007 by Shanghai Laogang Landfill Gas-to-Energy, a joint venture 60% owned by Shanghai Environment Group and 40% by Hong Kong Bloom Country Ltd, a 100% subsidiary of Veolia.

This project is supported by a public-private partnership contract of the BOO (Build-Own-Operate) type with a 25-year term.

## IMPLEMENTATION

- ▶ Designed, built, and operated by Veolia under a 25-year contract, the solution implemented is based on 11 generators and various ancillary facilities, low-voltage distribution facility, transformation substation to ensure the correct voltage level for the network, flares to burn excess methane, etc.
- ▶ Veolia's brought its expertise and advanced technologies, (including gas collection, gas pretreatment, gas engines/

generators and grid connection systems) and excellence in terms of environmental protection (reduction of landfill gas pollution, clean processing and closed circulating cooling system, realizing zero discharge of wastewater and solid waste, and the emission of gas meeting national standard).

- In 2012 the benefits of this project in relation to Climate Change enabled it to register with the United Nations as a "Clean Development Mechanism" (CDM). Introduced by the Kyoto Protocol, this mechanism allows companies established in emerging and developing countries with GHG reduction targets to earn credits in exchange for implementing or co-financing projects that reduce emissions. The company is then free to allocate these credits to units located elsewhere or sell them on the carbon credit exchange markets.
- Veolia has for a long time been involved in the CDM, in particular by obtaining the registration of several other projects that capture, treat and recover biogas.

## RESULTS

- /// • A substantial reduction in greenhouse gas emissions in the atmosphere, particularly of methane.
- In 2014, 60 million normal m<sup>3</sup> LFG were collected and treated, and 102,189 MWh Green Power generated which resulted in 25,800 metric tons CH<sub>4</sub> reduced (60% methane), 542,000 tons CO<sub>2</sub> equivalent reduced.
- A registration with the United Nations as a "Clean Development Mechanism" (CDM).

- /// Job creation during the project construction phase and during the operational phase with jobs that cannot be relocated.

- Electrical generation capacity: 15 MW
- Green energy production of around 100,000 Wh/annum, (equivalent to the energy consumption of 100,000 families)

## FINANCIAL COMPONENT OF THE OPERATION

- /// The production of green energy meets the needs of the site and allows to sell electricity to the public grid (East China Power Grid). Benefits are also associated with the implementation of a clean Development Mechanism (CDM) project approved by the United Nations Framework Convention on Climate Change.

- A public-private partnership contract of the BOO (Build-Own-Operate) type with 25-year term.

